

## SOCIETIES AND ACADEMIES.

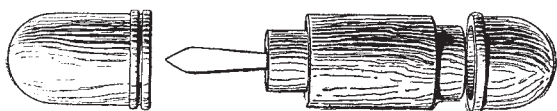
## LONDON.

**Royal Society, March 17.**—"On the Effect of a Magnetic Field on the Rate of Subsidence of Torsional Oscillations in Wires of Nickel and Iron, and the Changes Produced by Drawing and Annealing." By Prof. Andrew Gray, F.R.S., and Alexander Wood, B.Sc.

May 5.—"Experiments on a Method of Preventing Death from Snake Bite, capable of Common and Easy Practical Application." By Sir Lauder Brunton, F.R.S., Sir Joseph Fayrer, Bart., F.R.S., and Dr. L. Rogers.

Although this paper is a joint one, the authors mention that each had a different share in its production. The whole research may be regarded as the natural outcome of the work begun in India nearly forty years ago by Fayrer; the instrument employed was designed by Brunton and the experimental work was carried out by Rogers.

Of late years a great deal of important and instructive work has been done by Fraser, Calmette and others in regard to the preparation of antivenins, the injection of which will preserve life in animals poisoned by snake venom. This method of treatment, however successful it may be, is open to the objection that its application is very limited, as it can only be employed in places where the antivenins can be stored ready for use. In order that any method of preventing death from the bites of snake poison should be of much practical utility, it must be one which can be constantly at hand when wanted and easy of application by unskilled persons, and as it is especially needed by very poor people, such as the natives of India, it must also be very cheap. In connection with this paper, an instrument which seems to promise good results was shown at the Royal Society. It consists simply of a small lancet about



half an inch long with a hollow wooden handle, in which crystals of permanganate of potash are contained. The way in which it is proposed to apply the permanganate is, that anyone bitten by a snake should at once tear a strip from a turban, shirt or any other article of clothing, and tie it as quickly as possible above the bite. A cut should then be made with the lancet over the site of the bite so as to convert the puncture made by the snake's tooth into a small wound. Into this the crystals of permanganate of potash, moistened with saliva if necessary, are to be rubbed. Permanganate of potash as an antidote to snake poison was first used by Fayrer in 1869; it was shown by Wynter Blyth in 1877 to be a complete chemical antidote to cobra venom when mixed *in vitro*, and his results were confirmed by Brunton and Fayrer in 1878. The anti-vivisection law prevented them from carrying these experiments further at the time, but their continuance in this country has now been rendered possible by Dr. Waller's invention of a method of giving chloroform continuously for forty-eight hours or more. By means of this instrument Captain Rogers has been able to test the effect of permanganate of potash applied in the manner already described on rabbits and cats. Five out of six animals experimented upon survived after the injection of cobra poison, and a similar number survived after the use of Daboia poison. These experiments, which were entirely carried out by Captain Rogers, are very satisfactory, inasmuch as they show that the utility of permanganate of potash is not confined to one class of venom, but that it acts equally well with the venom of all kinds of snakes. The results obtained five minutes after the injection of the poison were as good as half a minute after injection, so that although very rapid absorption occurs during the first few seconds, it seems probable that absorption soon becomes slow from local effusion, and that sufficient time would thus be afforded for the application of the proposed antidote. Further experiments will be carried on by Captain Rogers in India, and if they prove as successful

as those which he made in this country, it is proposed that lancets,<sup>1</sup> with full directions for use, should be sold at a very cheap rate at all the post offices in India, in the same way as packets of quinine are sold at present. If the plan of treatment should prove efficacious, it will be a great pleasure to Sir Joseph Fayrer to see the fruition of the work which he began forty years ago.

**Chemical Society, May 18.**—Prof. W. A. Tilden, F.R.S., president, in the chair.—The action of nitrosyl chloride on pinene: W. A. Tilden. It is shown that the yield of this compound by the usual processes is improved by using a mixture of equal quantities of *d*- and *l*-pinenes. For the regeneration of pinene from the nitrosochloride, methylaniline is recommended in place of aniline.—The electrolytic estimation of minute quantities of arsenic: H. J. S. Sand and J. E. Hackford. The authors recommend the use of lead electrodes for the estimation of minute quantities of arsenic, as their application permits of a simplification of previous methods.—The action of sodium methoxide and its homologues on benzophenone chloride and benzylidene chloride, part ii.: J. E. Mackenzie and A. F. Joseph.—The bromination of phenolic compounds: J. T. Hewitt, J. Kenner and H. Silk. It is shown that when one molecular proportion of bromine acts on phenol, the character and proportions of the products obtained vary with the conditions under which the reaction is carried out. Absence of water and presence of a strong mineral acid favour the formation of *p*-bromophenol, whilst sodium acetate in a glacial acetic acid solution diminishes the quantity of para-derivative formed.—The decomposition of the alkylureas. A preliminary note: C. E. Fawsitt. An investigation of the velocity of decomposition of the alkylureas with acids shows that the hydrolysis is indirect, and is effected as a secondary reaction of the acid with the alkylammonium cyanate first formed.—The formation of periodides in nitrobenzene solution, part ii., periodides of the alkali and alkaline earth metals: H. M. Dawson and Miss E. E. Goodson. In general, these iodides have properties similar to those of the potassium derivative already described, and the experimental data indicate that enneaiodides of the type  $M'I_9$  or  $M''I_{18}$  probably represent the highest limiting type of periodides.—The action of ozone on ethane. Preliminary note: W. A. Bone and J. Drugman. The authors have obtained ethyl alcohol by the interaction of ethane and ozone at 100°. The paper gives an account of the method and apparatus employed.—Caproylthiocarbimide: A. E. Dixon. A description of this substance and of a number of its derivatives is given.

**Royal Meteorological Society, May 18.**—Capt. D. Wilson Barker, president, in the chair.—The principal causes of rain: the Hon. F. A. Rollo Russell. The chief causes of rain are only four, but several of these are often in co-operation. These causes may be briefly described as follows:—(1) the forced ascent of moist air by the slopes of mountains; (2) a mass of air invading rather suddenly another mass moving from an opposite direction and maintaining its flow below the opposing current which it displaces; (3) the ascent of more or less moist air through heavier and colder air to a height where condensation of vapour takes place, increased radiation of heat towards space, and often electrical developments producing further condensation, increase of temperature, and renewed ascent with the same results; (4) the mixture of currents of air from different directions.—On the observations of rainfall at the Royal Observatory, Greenwich, in the years 1815 to 1903: W. C. Nash. The author has made a full inquiry into the circumstances relating to the early history of the register, and has drawn up an authoritative table of rainfall for the long period of eighty-nine years. The average annual rainfall is 24.36 inches, and the number of rainy days 157. The greatest fall was 35.54 inches in 1903, and the least fall 16.38 inches in 1858. During the five months January to May, no monthly fall exceeding 4.37 inches was recorded, but in the remaining seven months there were twenty-four falls exceeding 5 inches. Light falls of rain are spread principally through the nine months January to September, with a decided preponderance in spring.

<sup>1</sup> The lancets were made by Messrs. Arnold and Sons, West Smithfield.

**Anthropological Institute**, May 24.—Prof. W. Gowland in the chair.—Mr. E. F. **Martin** exhibited a large collection of native objects which he had obtained during his residence in northern Nigeria. The exhibit, which was of great interest, comprised specimens of musical instruments, weapons, leather and brass work and pottery, chiefly manufactured by the Hausas.—The Rev. C. T. **Collyer** delivered a lecture on Korea and its people, which he illustrated by numerous lantern slides. Mr. Collyer, during his twenty years' residence in the country, had unrivalled opportunities of observing the Koreans, and in his lecture he gave a valuable account of their manners, customs and architecture. His slides illustrated native types and buildings, and he also explained by diagrams the plan of the Korean house, with the theoretical arrangements for separation of the sexes, their system of counting and their alphabet, which is simplicity itself, consisting of only twenty-five letters, in marked contrast to the elaborate system of ideography in use amongst the Chinese and Japanese.

**Linnean Society**, May 24.—Prof. S. H. Vines, F.R.S., in the chair.—Anniversary meeting. The following officers were elected:—President, Prof. W. A. Herdman; treasurer, Mr. Frank Crisp; secretaries, Dr. D. H. Scott and the Rev. T. R. R. Stebbing. The president devoted the greater part of his address to considering the life-work of Linnæus and his claim to the gratitude of later workers. The president then presented the Linnean gold medal to Dr. A. Günther.

**Physical Society**, May 27.—Mr. J. Swinburne, vice-president, in the chair.—The law of action between magnets and its bearing on the determination of the horizontal component of the earth's magnetic field with unifilar magnetometers: Dr. C. **Chree**. Starting with the general formula for the action between two magnets perpendicular to one another, in Lamont's first position, the author discusses how observations should be combined when the higher terms usually neglected in magnetometer reductions are taken into account.—On the ascertained absence of effects of motion through the æther in relation to the constitution of matter on the FitzGerald-Lorentz hypothesis: Prof. J. **Larmor**. In consequence of recent misapprehensions (*cf.* D. B. Brace, *Phil. Mag.*, March), the argument on this subject, as given in "Æther and Matter" (1900), is briefly re-stated. The absence of effect of convection, to the first order, was demonstrated by Lorentz. Absence of effect to the second order of the ratio of the velocity of convection to that of radiation has now been experimentally established, as regards optical interference with long path, by Michelson; as regards mechanical action on a charged electric condenser, by Trouton; as regards double-refraction, by Lord Rayleigh and by Prof. Brace. This suggests strongly a complete correspondence in detail between the material system connected with the earth's motion and the same system at rest in the æther, so that their internal relations are indistinguishable. Theoretically such complete correspondence, up to the second order, exists, involving the FitzGerald-Lorentz shrinkage, provided a purely electrical constitution of matter (as regards its physical relations) is granted, but apparently not otherwise. Thus it is held that these phenomena point consistently in that direction.—On coherence and re-coherence: Dr. P. E. **Shaw** and C. A. B. **Garrett**. In a paper in the *Phil. Mag.* (March, 1901), Dr. Shaw described a method of investigating coherence by measuring the forces required to sunder the cohered surfaces. It was there shown that forces of the order of 1 dyne were required for a copper-copper contact of two single wires. Further, there seemed to be evidence of a change of state at the place of coherence, possibly orientation of the particles at the contact. In the present paper the authors follow the same method of investigation, adducing evidence that coherence can be explained, and only explained, by Lodge's original theory of fusion, and further establishing the after-effect, whether orientation or otherwise, mentioned in the former paper.

CAMBRIDGE.

**Philosophical Society**, May 16.—Dr. Baker, president, in the chair.—Note on the effect of a magnetic field on the vibrations of an atom containing six corpuscles placed at the corners of a regular octahedron: Prof. **Thomson**. The

Zeeman effect for a single corpuscle vibrating about its position of equilibrium is to split up the spectral line corresponding to its free vibration into a triplet, the difference between the frequencies of the extreme lines of the triplet being  $He/m$ , in a field of strength  $H$ . Measurements of the magnetic separation of lines in the spectra of various elements show that different lines may experience different separations. The object of this note is to describe a model atom the vibrations of which would not all be affected in the same way by a magnetic field. It is shown that if six corpuscles are arranged at the corners of an octahedron their vibrations will under the magnetic field be split up into three triplets; in one of these the separation of the frequencies will be normal, *i.e.*  $He/m$ , while in the other two the separation will only amount to *half* the normal value.—The effect of screening on ionisation in closed vessels: A. **Wood**. Previous experimenters have shown that the so-called spontaneous ionisation in closed vessels is in part due to a radiation from the walls of the vessels. The experiments described go to show that this radiation consists of two kinds, (a) a secondary radiation excited by a penetrating radiation from without, and (b) an intrinsic radiation probably due to a true radio-activity of the material. The former predominates in vessels of iron, zinc and tin; the latter in vessels of lead and aluminium.—Quasi radio-activity produced by the point discharge: S. A. **Edmonds**. A metallic body becomes quasi radio-active when points are made to face it, and both points and body are connected to the terminals of a Wimshurst machine, and the discharge passed in dusty air. When caused to pass in the outside air, or in air freed from dust either by settling or by filtration through glass-wool, no effect is obtainable. All metals act equally well, while the points do not become at all active. This quasi activity is considered to be due to the dust particles in the air trapping the ions present during the discharge and forming a film of them on the surface of the body.—Magnetic deflexion of the negative current of electricity from a hot platinum wire at low pressures: G. **Owen**. The paper contains an account of experiments made to obtain some information with regard to the mechanism of the discharge at low pressures. The experiments lead to the conclusion that the carriers of the current are mainly corpuscles at all temperatures. When proper precautions are taken, about 90 per cent. of the carriers are deflected by a magnetic field corresponding to that required to deflect particles for which the ratio  $e/m$  is  $10^7$ .—Some photoelectric effects: W. M. **Varley**.—Note on the atomic weight of bismuth: R. H. **Adie**. In this note the author gave his determinations of the atomic weight of bismuth, which confirm the results of Classen and fix the value at about 208.8.—Note on compounds containing an asymmetric nitrogen and an asymmetric carbon atom: H. O. **Jones**. The investigation of the formation of compounds containing an asymmetric nitrogen atom from an optically active tertiary amine was undertaken in the hope that the two possible isomerides would be formed in unequal quantities and separable by ordinary means. This expectation has been realised for the union of methyl-*l*-amyl-aniline with allyl and benzyl iodides.—The spatial configuration of trivalent nitrogen compounds: H. O. **Jones** and J. P. **Millington**. The paper describes the results of some experiments made with the view of obtaining evidence as to the configuration of trivalent nitrogen compounds, by attempting to resolve compounds in which the valency of the nitrogen should not change during the process. Methyl-ethyl-aniline-sulphonic acid was prepared and its brucine salt submitted to fractional crystallisation, but without effecting any resolution, and similarly with the dextro-camphor-sulphonate of benzyl-phenyl-hydrazine. It is therefore concluded that the three groups attached to the trivalent nitrogen atom are normally situated in the same plane with it.—Relations among perpetuants: A. **Young**.—On the proportion of the sexes among the Todas: R. C. **Punnett** and W. H. R. **Rivers**.

EDINBURGH.

**Royal Society**, May 2.—Prof. Geikie in the chair.—In a paper on the date of upheaval which caused the twenty-five-foot raised beaches in central Scotland, Dr. Robert **Munro** went carefully into the evidence, and gave



reasons for fixing the date of upheaval subsequent to the Bronze age and anterior to the Roman occupation.—Dr. R. H. **Traquair** exhibited a skull of the great extinct ox (*Bos taurus*, var. *primigenius*), and certain remains of reindeer, which had been found in the grounds of Dundas Castle, Dalmeay. The skull was very large, and indicated a great stretch of horns.—Prof. A. Crichton **Mitchell** gave certain preliminary results he had obtained on the rate of convective loss of heat from a surface exposed to a current of air. A thin strip of platinum foil formed the one branch of a Wheatstone bridge, which was constructed so as to be able to carry very powerful currents. The current through the strip was strong enough to raise it to the temperature of incandescence, and was measured accurately on a galvanometer placed suitably in the circuit. The strip was enclosed in a tube through which a blast of air was drawn by means of a large fan worked by a gas engine. The velocity of the air was measured directly in each case. The experiment consisted in finding the resistance of the strip, and therefore its temperature, for given values of heating current and velocity of air. It is evident that for moderate velocities of air current the strip will, for a particular value of electric current passing along it, be cooled more or less according as the air current is greater or smaller. The results so far obtained indicated that even in still air a large part of the cooling was due to convection. It was hoped that the experiments would lead to important information as to the relative amounts of convection and radiation when a surface was cooling in the air.

May 16.—Sir John Murray in the chair.—Dr. J. **Halm** read a paper on a cosmic theory of the diurnal and long-period changes of terrestrial magnetism and their possible connection with seismic phenomena and the displacement of the earth's axis of rotation. On the assumption that the atmosphere is a feeble electric conductor set in oscillation by the thermal and gravitational action of the sun and moon, an expression was obtained for the diurnal variation of magnetic potential. This contained as a factor the variation in height of a mass of air. But on the assumption that the air was in an average state of convective equilibrium, the principles of thermodynamics led to the result that this time variation in height was proportional to the time variation of the air temperature at the earth's surface. Hence was deduced the formula  $V = a \sin 2\phi d\theta/d\lambda$ , where  $V$  is the magnetic potential,  $\phi$  is the latitude,  $\lambda$  the longitude,  $\theta$  the temperature, and  $a$  a constant. The equipotential curves so obtained showed a remarkable resemblance to Schuster's curves deduced from magnetic observations, the main difference being a lag in longitude (equal to time) of the real curves as compared with those deduced from theory. The next step in the argument was to consider the possible strains which might result from this diurnal variation in magnetic distribution, and the conclusion was that such strains would cause a slight bulging on the side next the sun. This one-sided tide agreed with the indications of the horizontal pendulum as found by Ehlert, and with the recent measurements of change of direction of plumbline. It was easy to see that the change in declination of the sun would give rise to seasonal effects, and the periodicity indicated for various latitudes agreed in a suggestive manner with the seasonal curves of seismic activity in these latitudes. By an application of the same principle of convective equilibrium, Dr. Halm showed that the daily oscillation of the barometric pressure could be represented as the sum of two terms, of which one depended on the change of temperature from the mean and the other on the second differential coefficient of the temperature at the surface. The constant factor multiplying the latter term is the same along a latitude parallel, at least to a first approximation, but the multiplier of the former term depends on the character of the locality according as it is maritime, continental, or mountainous. The general theory advanced brought into connection not only meteorological and magnetic phenomena, but also seismic activity, change of latitude, and displacement of the earth's axis, and all as a result of solar radiation acting on the earth's atmosphere. It was natural to search for the eleven-year period in these variations. A careful tabulation of Omori's recent statistics of earthquakes in Japan from the earliest recorded cases showed an undoubted

eleven-year period, and gave another argument in favour of the idea that seismic activity was influenced by magnetic changes. The paper touched upon several other astronomical and meteorological problems.

## PARIS.

**Academy of Sciences**, May 30.—M. Mascart in the chair.—The chemical effects of light. The action of hydrochloric acid upon platinum and gold: M. **Berthelot**. Pure gold and platinum are slowly attacked by fuming hydrochloric acid in the presence of light; control experiments in which these metals were treated with hydrochloric acid and kept in the dark gave no metal in solution. In the presence of manganese chloride the amount dissolved was nearly doubled.—Study of the solubility of silicon in silver. On a variety of crystallised silicon soluble in hydrofluoric acid: H. **Moissan** and F. **Siemens**. Silicon is much more soluble in fused silver than in lead or zinc. The crystallised silicon found in the solidified metal contains a certain proportion of an allotropic variety of silicon which is soluble in hydrochloric acid. The experimental results are expressed in the form of a curve, showing the relation between the total silicon dissolved as a function of the temperature, and also of that portion which is soluble in hydrofluoric acid.—On the formation in nature of vanadium minerals: A. **Ditte**.—On the use of stereoscopic images in the construction of topographical plans: A. **Laussedat**.—The effects of small oscillations of external conditions on a dependent system of two variables: P. **Duhem**.—On a phenomenon analogous to phosphorescence produced by the  $n$ -rays: E. **Bichat**. A copper plate is exposed to the action of a bundle of  $n$ -rays of definite wave-length, obtained from a Nernst lamp after refraction through an aluminium prism. The secondary rays emitted by the plate are analysed by means of a slit and an aluminium prism, making use of a phosphorescent screen. It is found that, in accordance with Stokes's law, the secondary radiations are of greater wave-length than the primary radiations from which they are derived.—Magnetic observations at Tananarive: P. **Colin**. Tables of the absolute values of declination and inclination for the year ending April, 1904.—The synthesis of a series of tertiary alcohols, starting from cyclohexanol: Paul **Sabatier** and Alph. **Mailhe**. It has been recently shown that cyclohexanol can be readily obtained in quantity from phenol by the action of hydrogen and reduced nickel. By treating with alkyl-magnesium compounds, this substance yields a series of tertiary alcohols. The mode of preparation and the physical properties of a number of these alcohols are given, the reaction appearing to proceed equally well with both fatty and aromatic compounds.—The hydrographic study of the coasts of France, from 1902 to 1903: M. **Laporte**.—On the foundations of a systematic theory of spherical functions: Niels **Nielson**.—On the universal joint: L. **Lecornu**.—On the simultaneous emission of the  $n$ - and  $n_1$ -rays: Jean **Becquerel**. From the variation in the intensity of a feebly phosphorescent screen under the influence of the  $n$ -rays with the angle at which the screen is viewed, the conclusion is drawn that under the influence of the  $n$ -rays such a screen emits  $n$ -rays normally and  $n_1$ -rays tangentially. Experiments in support of this view are given.—The action of anæsthetics on the sources of the  $n_1$ -rays: Julien **Meyer**. Sources of  $n_1$ -rays, like those of the  $n$ -rays, are affected by anæsthetics.—On a new method of obtaining photographs in colours: Auguste and Louis **Lumière**. The method described in the present communication is based on the use of coloured particles arranged in a layer on a glass plate; this is covered with a suitable varnish, and finally with a layer of sensitive emulsion. The plate thus prepared is exposed through the back, developed, and the image thus prepared inverted, giving the colours of the original photograph on looking through it.—On a new regulator allowing of the control of the vacuum in a Crookes's tube: M. **Krouchkoll**. A side tube is blown on to the bulb containing some glass wool. After the tube has become hard through use, it is only necessary to warm the glass wool slightly, when sufficient air is given off to restore the tube to its original condition.—Acetylenic aldehydes. New method of preparation; the action of hydroxylamine: Ch. **Moureu** and R. **Delange**. The acetylene hydrocarbon is heated for twenty-

four hours with an alkyl-magnesium compound. Yields of acetal amounting to about 75 per cent. of the theoretical are obtained. These acetals are readily hydrolysed to the corresponding aldehydes by dilute sulphuric acid. These aldehydes, on treatment with hydroxylamine, do not give oximes, but isoxazols, several of which are described.—The differences of histological structure and secretion between the anterior and posterior kidney in male elasmobranchs: I. **Borcea**.—On the respective functions of the two parts of the adductor muscles in the lamellibranchs: F. **Marceau**.—On the adaptation of the plant to the intensity of light: M. **Wiesner**.—On the permeability of the tegument of certain dried seeds to the atmosphere: Paul **Becquerel**. If the tegument is carefully dried, it is absolutely impermeable to the gases of the atmosphere. In the presence of moisture, however, these gases pass through. Hence the complete suspension of all the phenomena of respiration of the seed is only realised in the absence of moisture.—On the spontaneous radiations of *Sterigmatocystis versicolor*: Paul **Vuillemin**.—A case of the emission of the  $n$ -rays after death: Augustin **Charpentier**.—The lipolytic property of the cytoplasm of the castor-oil seed is not due to a soluble ferment: Maurice **Nicloux**.—On an albumen extracted from the eggs of the frog: J. **Galimard**.—On the condition of the starch in stale bread: E. **Roux**.—The motive action of the pneumogastric nerve on the biliary vesicle: D. **Courtade** and J. F. **Guyon**.—On the toxicity of the chlorhydrate of amylene: L. **Launoy** and F. **Billon**.—Contribution to the study of Bence-Jones albuminuria: G. **Patein** and Ch. **Michel**.—The amount of albuminoid material necessary in human diet: H. **Labbe** and M. **Morchoisne**.—On ten cases of arterial hypertension treated by d'Arsonvalisation: A. **Moutier**. In all the cases the arterial pressure was reduced to the normal. At the same time, in some of the cases, the symptoms of arterio-sclerosis disappeared in great part.

## DIARY OF SOCIETIES.

THURSDAY, JUNE 9.

ROYAL SOCIETY, at 4.30.—Notes on the Statolith Theory of Geotropism. (1) Experiments on the Effects of Centrifugal Force. (2) The Behaviour of Tertiary Roots: F. Darwin, For. Sec. R.S., and Miss D. F. M. Pertz. —The Fossil Flora of the Culm Measures of North-West Devon, and the Palaeobotanical Evidence with regard to the Age of the Beds: E. A. Newell Arber. —On the Structure and Affinities of Palaeodiscus and Agelacrinus: W. K. Spencer. —On the Ossiferous Cave-Deposits of Cyprus, with Descriptions of the Remains of *Elephas cypricus*: Miss D. M. A. Bate. —On the Physical Relation of Chloroform to Blood: Dr. A. D. Waller, F.R.S.—Contributions to the Study of the Action of Sea-Snake Venoms: Sir Thomas R. Fraser, F.R.S., and Major R. H. Elliot, I.M.S.—On the Action of the Venom of *Bungarus coruleus* (the Common Krait): Major R. H. Elliot, I.M.S., W. C. Sillar, and G. S. Carmichael. —On the Combining Properties of Serum-Complements and on Complementoids: Prof. R. Muir and C. H. Browning.

MATHEMATICAL SOCIETY, at 5.30.—The Application of Poisson's Formula to Discontinuous Disturbances: Lord Rayleigh.—Some Expansions for the Periods of the Jacobian Elliptic Functions: H. Bateman.—Types of Covariants of any Degree in the Coefficients of Each of any Number of Binary Quantics: P. W. Wood.

INSTITUTION OF ELECTRICAL ENGINEERS, at 5.—Annual General Meeting.

FARADAY SOCIETY, at 8.—The Hard and Soft States in Metals: G. T. Beilby.—The Electric Furnace; its Origin, Transformations, and Applications: Adolphe Minet.

FRIDAY, JUNE 10.

ROYAL ASTRONOMICAL SOCIETY, at 5.—The Rotation Period of Saturn: W. F. Denning.—Analyses of Errors of Moon's Longitude for Inequalities of Longer Periods; Methods and Results: P. H. Cowell.—Note on the Gyroscopic Collimator of Admiral Fleuriat: M. E. J. Gheury.—Variation in Latitude of the Greater Sun-Spot Disturbances, 1881-1903: Rev. A. L. Cortie.—The Mass of Jupiter, and Corrections to the Elements of the Orbits of the Satellites, from Heliometer Observations made at the Cape, 1901 and 1902: Bryan Cookson.—The Parallax Inequality—a Reply: P. H. Cowell.—*Promised Papers*: Solar Parallax from Observations of Eros: A. R. Hinks.—Note on the Distribution of Sun-Spots in Heliographic Latitude: E. W. Maunder.—Micrometric Measures of Double Stars made with the 28-in. Refractor in 1903: Royal Observatory, Greenwich.—Sir David Gill will give an Account of the New Clock of the Cape Observatory.

PHYSICAL SOCIETY, at 8.—Projection of the Indicator Diagrams of a Petrol Motor: Prof. Callendar, F.R.S.—A Model Illustrating the Propagation of a Periodic Electric Current in a Telephone Cable, and the Simple Theory of its Operation: Prof. Fleming, F.R.S.—Exhibition of a Gyroscopic Collimator: M. E. J. Gheury.

MALACOLOGICAL SOCIETY, at 8.—On *Damayantia smithi*, Godwin-Austen and Collinge: Lt.-Col. H. H. Godwin-Austen.—Descriptions of Twenty-nine Species of Gastropoda from the Persian Gulf, Gulf of Oman, and Arabian Sea, dredged by Mr. F. W. Townsend, 1903-4: J. Cosmo Melvill.—*Conus coromandelicus*, Sin, its Probable Affinities and Systematic place in the family Conidae: J. Cosmo Melvill.—Descriptions of New Marine Shells from the Collection of the late Admiral Keppel: G. B. Sowerby.—Note on *Voluta brazieri*, Cox: E. A. Smith,

I.S.O.—On *Doris planata* of Alder and Hancock: Sir C. Eliot, K.C.M.G.—Description of a Helicoid Land Shell from Central Australia: J. H. Ponsoby.—On Some Semi-fossil Land Shells found in the Hamakua District, Hawaii: C. F. Ancey.

MONDAY, JUNE 13.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Western Uganda: Rev. A. B. Fisher.

TUESDAY, JUNE 14.

ROYAL PHOTOGRAPHIC SOCIETY, at 8.—A New Principle in Photographic Lens Construction: Conrad Beck.

WEDNESDAY, JUNE 15.

ROYAL MICROSCOPICAL SOCIETY, at 8.—A Direct Proof of Abbe's Theorems on the Microscopic Resolution of Gratings: Prof. J. D. Everett, F.R.S.—Report on the Recent Foraminifera of the Malay Archipelago, Part xvi: F. W. Millett.—Lecture on Nature's Protection of Insect Life, with Lantern Illustrations: F. Enock.

ROYAL METEOROLOGICAL SOCIETY, at 4.30.—Effects of a Lightning Stroke at Earl's Fee, Bowers Gifford, Essex, April 13, 1904: Rev. C. F. Box.—An Instrument for Determining the True Direction and Velocity of the Wind at Sea: A. Lawrence Rolch.

CHEMICAL SOCIETY, at 5.30.—(1) The Mechanical Analysis of Soils, and the Composition of the Fractions resulting Therefrom; (2) The Effect of the Long-continued Use of Sodium Nitrate on the Constitution of the Soil: A. D. Hall.—(1) The Decomposition of Oxalates by Heat. (2) Some Alkyl Derivatives of Sulphur, Selenium, and Tellurium: A. Scott.—The Ultra-violet Absorption Spectra of certain Enol-keto-tautomers. Part I: Acetylacetone and Ethyl Acetoacetate: E. C. C. Baly and C. H. Desch.—The Action of Acetyl Chloride on the Sodium Salt of Diacetylacetone and the Constitution of Pyrone Compounds: J. N. Collie.—Our Present Knowledge of the Chemistry of Indigo: W. P. Bloxam.

THURSDAY, JUNE 16.

ROYAL SOCIETY, at 4.30.—*Probable Papers*: The Decomposition of Ammonia by Heat: Dr. E. P. Perman and G. A. S. Atkinson.—On Flame Spectra: C. de Wetteville.—On the Origin and Growth of Ripple-Marks: Mrs. H. Ayrton.—The Influence of Rainy Winds on Phthisis: Dr. W. Gordon.

LINNEAN SOCIETY, at 8.—Variations in the Arrangement of Hair in the Horse: Dr. Walter Kidd.—An Account of the Jamaican Species of Lepanthes: W. Fawcett and Dr. A. B. Rendle.—On the Blaze-currents of Vegetable Tissues: Dr. A. D. Waller, F.R.S.—British Freshwater Rhizopoda: James Cash.—Notes on the "Sudd" Formation of the Upper Nile: A. F. Brown.—The Place of Linnæus in the History of Botany: P. Olsson-Seffon.

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